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ABSTRACT

A small, local school district in north central Ohio, in making application for state funds to construct a new school, requested parent and community input. An exploratory study asked students what kind of classroom would improve their learning. The student assessment was part of a class assignment and took the form of pencil drawings. Three hundred thirty five drawings from students in grades K-8 were reviewed, the ideas categorized and recorded, and a tally of the ideas entered into a database. Analysis examined the relationships among ideas, grade level (primary, intermediate, and middle school), and gender. Findings suggested that students have very traditional perceptions of hypothetical classrooms and that comfort is important. A surprising absence of academic ideas was evident. The usefulness of this technique for studying student perceptions of space is discussed. Appended are samples of student drawings. (Contains 2 tables and 11 references.) (Author/BT)

'Drawing' Conclusions about Public School Facility Needs: Pupil Perception of
Space Illuminated through their Art

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Abstract

A small, local school district, in making application for state funds to construct a new school, was requesting parent and community input. In an exploratory study, we decided to ask students what they would like a classroom to look like to improve their learning. The assessment took the form of pencil drawings, as part of a class assignment, from 335 students grades K through eight. Each drawing was reviewed, the objects categorized and recorded, and a tally of the objects entered into a database. Analysis included the relationships between objects, grade level (primary, intermediate and middle school), and gender. Results suggested that students have very traditional perceptions of hypothetical classrooms and that comfort is important. A surprising absence of academic objects was evident. Usefulness of this technique for studying student perceptions of space is discussed.

‘Drawing’ Conclusions about Public School Facility Needs: Pupil Perception of Space Illuminated
through their Art

“School design must reflect deep-seated change in educational philosophies (Rydeen, 1993, p. 34).” Such deep-seated changes are evident from expert facility planners. The image of the school may be related to a desire to attend, thereby creating a homelike atmosphere (Lilley, 1985). Because facilities directly influence learning and human performance, specifications for facilities should include views of schools held by children (Hathaway, 1991). Assessing post-occupancy of a new school should be concerned with student reactions, but measurement is no simple problem (Earthman, 1985). Asking students to complete surveys and questionnaires is problematic. It is intrusive and potentially very difficult for younger people. However, drawing has had a rich history in psychological and educational research (Koppitz, 1968). More recently, in a middle school evaluation project (Haney, Russell, Gulek, and Fierros, 1998), student drawings were used to augment the traditional evaluation data. They found that the drawings greatly engaged teachers in the process. We thought this might be a useful technique to assess students’ desires for making the classroom a comfortable, stimulating place to learn. We also believed that authentic student work might provide school boards and planners more person-friendly evidence, in to contrast to statistical studies derived from community surveys.

The Ohio General Assembly made funds available to public schools to build new or improved facilities. Parents’ and community members’ preferences often are surveyed through questionnaires or public meetings. However, we were unable to find evidence that the children who would be using these facilities for approximately 1080 hours per year were asked for input.

Written surveys for young children are problematic because of reading and writing ability, but use of artwork has potential. Although a potentially time-consuming process, we see this as an enlightening way to augment planning for building school facilities. The technique is a nondisruptive way of getting feedback from younger children.

This study was planned as an exploratory investigation. Our goals were to evaluate the collection and use of student drawings for school decision-making, and to begin to understand how students perceive the physical arrangement of a classroom for their learning.

Methods

Students (N=335) from a small local school district in north central Ohio provided pencil drawings for this study. The second author teaches art education and has worked with teachers in this school before. He asked them to use our prompt for a normal drawing assignment in class. During a typical drawing session, each teacher asked their students to: "draw a classroom with all the things that would make it a better place to learn." They then elaborated with students when necessary. Students from kindergarten through eighth grade participated. There were 160 boys and 172 girls identified. Three grade-level groups were formed: 85 students at the Primary level (grades K, 1, 2); 170 at the Intermediate level (grades 3, 4, 5); 80 at the Middle School level (grades 6, 7, 8). Some students did not participate because of their absence or their teachers at the Middle School were unable to schedule the necessary time.

A 9" by 13" sheet of unbleached card stock paper was used as the drawing sheet. A graphite pencil was the instrument of choice, although occasionally students colored in the pencil drawing. The drawings were collected over the course of one week and organized by the second author. Following their organization, each drawing was reviewed, the objects in the drawing

were recorded, and the grade and gender were noted. Two individuals were trained by the first two authors on how to recognize objects. A random group of 20 drawings was reviewed by the authors and the recorders. There was 100% agreement. In the course of the full analysis, where a recorder could not make a determination, which happened less than a dozen times, the authors made the final determination. A list of all objects was made. Frequencies of occurrence of all objects were tallied. Then rank ordered lists of object occurrences were created. The lists compared the rank of occurrences among all students, between males and females, and among Primary, Intermediate, and Middle grade levels.

Results and Discussion

The frequencies of occurrences appear in Tables 1 and 2. Table 1 contains a descending rank ordered list of all objects identified in the children's drawings. Columns two and three contain the ranking by males and females of the object in column one. The number in parentheses indicates the percent of students who included this object in their drawing. Similarly, Table 2 contains all objects identified in the children's drawings. Columns two, three, and four contain the ranking by Primary, Intermediate, and Middle grade levels of the object in column one. To give you some idea of the students' work, the Appendix contains several examples of the drawings. They are marked with the grade level and gender of the artist.

The top ten objects appeared in more than 20 percent of the 335 drawings. Student desks (43.5%), chalkboards (42.4%), and computers (38.5%) were the most frequent objects. The next seven objects included shelves, tables, clocks, teachers' desks, doors, chairs, and TV. Windows, flags, globes, calendars, lights, bulletin boards, books, wastebaskets, closets, and easy chairs made up the next ten. Their frequency was less than 10 percent. The diversity of the remaining ranked

objects was wide, e.g., vending machines to lockers, beds to heaters, pets to ponds, and video tapes/CDs to robots. With the exception of the very popular chalkboards and computers, students drew classrooms that contained more amenities related to comfort, than to things traditionally related to learning. For example, very little reference was made to bulletin boards (4.8%), books (3.9%), video tapes/CDs (1.2%), alphabets (1.8%), science-related objects (aquaria, 2.7%), microscopes (0%), and calculators (.9%). See Table 1.

Gender differences were explored by comparing the boys' occurrence ranking with the girls'. See Table 1. Chalkboards, student desks, and computers were the top objects for boys and girls, although the rankings based upon percent were not the same. Boys drew desks (41.9%) and computers (41.9%) more often, while girls drew chalkboards more often (46.5%). Interestingly, the largest discrepancy between boys and girls was with chalkboards (38.8% vs. 46.5%) and computers (41.9% vs. 35.5%). Girls drew chalkboards over computers; the converse was true for boys. Other discrepancies were with teachers' desks and large screen TV. Boys drew large-screen TVs more than girls (26.3% vs. 15.1%). Girls drew slightly more teachers' desks than boys (28.5% vs. 22.5%).

Grade level differences were explored by comparing primary grade (K-2) occurrence ranking with intermediate (3-5) and middle level (6-8) grades. See Table 2. The younger grade group drew noticeable fewer types of objects than the other two grade levels, i.e., primary included only 23 of the 56 diverse drawing objects (41%). Middle level included 80% of all objects and intermediate included 95%. Younger students generated the least number of objects and intermediate the most number. Perhaps the intermediate students are more fluid with ideas or the older students just did not take the drawing assignment as seriously.

Primary and intermediate students included student desks as their most common drawing objects (42.4% and 48.2%, respectively). Middle level included computers as the top object (56.3% and the only percent over majority). Middle level's ranking for student desks was four (35%). All grade groups included chalkboards as the second most common object occurrence. Computers ranked fourth for primary (21.2%) and third for intermediate (38.8%). The younger students included more clocks (third ranking--35.3%) than intermediate and middle students (ninth--28.8% and twelfth--10%, respectively). Younger grades are probably more focused on telling time. However, one would think that middle level students, with changing of classes, would have included more clocks too. They may be more conditioned to the bells and the sequence of periods, although students are "clock-watchers" towards the end of a class period.

Teachers' desks were most common among the intermediate students (35.3%), followed by middle level (22.5%), and then primary (9.4%). It is reasonable to assume that primary teachers spend very little time at their desks, so students would not perceive that as important to their learning. This perception shifts at the intermediate level, and then shifts back at the middle level where teachers spend more time away from their desk lecturing and visiting student desks.

TV/large screen appeared in 36.3% of middle level drawings (ranking third). Whereas, primary and intermediate drawings were 4.7% (14th) and 20.6% (10th), respectively. Apparently, the older students placed more importance on multimedia than the younger students. Except for video games and tapes/CDs, no other evidence of multimedia objects was present. None appeared in the primary level drawings. We expected greater evidence of audio and video sources of information. Perhaps drawings of computers represented information multi-media sources through internet connection that is available in the classrooms.

Another surprising finding, that seems related to technology, is infrequency of distinct books in the drawings. Among primary level drawings books ranked 13th (5.9%), among intermediate drawings books ranked 18th (4.7%). There were no books in middle level drawings, although one set of shelves contained magazines (noted by the artist).

Conclusions and Implications

"In a print-oriented culture, drawing may put children on an equal footing with adults in terms of adequacy of expression" (Haney, Russell, Gulek, and Fierros, 1998, p. 41). Thus, in order to know more about the thinking and feeling of children, we might give more serious consideration to their drawings. Use of children's drawings is widely documented in clinical psychology (Koppitz, 1968) and is often referred to as "a language rather than a means to create beauty" (Goodenough, 1975, p. 12). It is not without criticism. There is controversy about the validity of drawings as far as the potential misinterpretation of the objects is concerned (Golomb, cited by Haney et al.).

Our exploratory use of the drawings was not to make assessments about individual students. Rather, our intention was to document patterns of the occurrence of objects recorded by a large number of students. From that we made inferences about group preferences for the physical elements in a classroom. Certainly, student experiences with traditional items in their classrooms will create stereotypes. The stereotypical contents ought to appear in their drawings. Nevertheless, we believe this is no different than what would be achieved by surveying in writing or interviewing students. The reliance on language may limit their expression because of reading and writing deficits or normal developmental limitations. Creativity may be limited as well by forcing more attention to selection and use of the appropriate word for the classroom objects,

rather than on the imagery of the whole classroom and its contents. Finally younger students just may be more comfortable with drawing than with other mediums.

Overall we found that when students were asked to "draw a classroom with all the things that would make it a better place to learn", they created very conventional pictures of the classroom. The drawings probably would be no different than drawings asked of students fifty years ago. Student and teacher desks, chalkboards, shelves, tables, doors, and clocks were predominant among the top ten to fifteen ranking. The only exception was the high frequency of desk-top computer drawings. The remaining objects were diverse, but could be classified as items making the classroom more physically comfortable with access to conveniences. Vending machines, easy chairs, restrooms, couches, and TVs were evident. Aside from globes, there was only a modest presence of objects directly related to learning. Books appeared only occasionally and then never on student desks or in students' hands, when figures were drawn,

Gender differences emerged with a number of objects. Computers and TV/large screen devices appeared more in boys' drawings than in girls'. More teachers' desks, chalkboards and bulletin boards were noted in girls' drawings than boys'. We speculate that the drawings reflect developmental differences evident in schools. Girls' are no less computer literate, but they tend to lose personal interest in computers sooner than boys (Kelly, 2000) and are more concerned with personal relationships than individualized activities like computers and related games that tend to have an aggressive, competitive focus (cf. Gilligan, 1993). Girls seem to have more objects related to the teacher and less related to technology.

Grade level comparisons in drawings reflected standard developmental differences. Younger students demonstrated less diversity in their drawings and were more primitive than

older students' drawings. The oldest students' drawings had the most objects related to technology, comfort and amenities. There was a conspicuous absence of books. In fact, the middle level group accounted for the population's greatest occurrences of technology, amenities, and absence of books.

Generally, students drew objects in their hypothetical classroom that were very traditional or emphasized a need for comfort. Whether the presence of these traditional objects was due to stereotypical perceptions of a classroom, or they were items that students truly want is unclear. However, the fact that most classrooms do not contain comfortable seating and other amenities and these were included in a large number of drawings, suggests that students value and would like them to be part of the classroom. Research studies summarized by Weinstein (1979) indicated that there is no relationship between achievement and furniture arrangement, aesthetic appeal, and presence of windows. However, behavior and attitudes were related to student density and comfort in a classroom. Many of us who spend a good deal of the day in a separate room (office or classroom) embellish it with amenities like comfortable chairs, lighting, musical recordings, photographs and other memorabilia. It is not surprising to find this need among children. Yet it is not met in typical school classrooms. Most kindergarten and many primary classrooms have a carpeted area, pillows, a sofa or other comfortable seating for reading. None of us would choose to read for enjoyment by propping up at the kitchen counter or table. We find an easy chair, sofa or bed to do that kind of reading. If we as educators mean it when we say we want more children to read, maybe we can better facilitate that by providing our schools with comfortable and age-appropriate areas for children to practice their reading without being distracted by uncomfortable chairs, desks, and lighting.

Students' drawings of classrooms provided rich perceptual data on the contents of a learning environment. Although time consuming to plan and analyze the data, this technique could collect information from students in an unobtrusive way as part of instruction. The results may be of more interest to teachers, parents and community members than survey results (Haney et al.) and possibly of more use to facility planners because of personal, rich, detailed visual information. Further research on the relative size and location of the objects in the drawing space may tell us something about importance not possible by just tallying number of object occurrences.

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Table 1.
Ranked Categories For Total Students, Males, and Females

Total (N = 335)	Males (N = 160)	Females (N = 172)
Rank Category (%)	Rank (%)	Rank (%)
1 Student Desks (43.6)	1 (41.9)	2 (45.9)
2 Chalkboards (42.4)	3 (38.8)	1 (46.5)
3 Computers (38.5)	1 (41.9)	3 (35.5)
4 Shelves (26.9)	6 (25.0)	5 (27.9)
5 Tables (26.3)	7 (24.4)	6 (27.3)
6 Clocks (26.0)	5 (25.6)	7 (26.7)
7 Teacher's Desk (25.7)	10 (22.5)	4 (28.5)
8 Door (25.1)	8 (23.8)	8 (26.2)
9 Chairs (23.6)	9 (23.1)	9 (23.8)
10 TV/Large Screen (20.3)	4 (26.3)	10 (15.1)
11 Windows (9.0)	11 (7.5)	11 (9.9)
12 Flag (7.8)	11 (7.5)	12 (8.1)
13 Globe (6.3)	11 (7.5)	15 (4.7)
14 Calendar (5.4)	15 (5.0)	14 (5.8)
15 Lights (5.1)	14 (5.6)	15 (4.7)
16 Bulletin Boards (4.8)	38 (1.3)	12 (8.1)
17 Books (3.9)	15 (5.0)	22 (2.9)
18 Wastebaskets (3.6)	20 (3.1)	17 (4.1)
18 Closet (3.6)	23 (2.5)	17 (4.1)
20 Easy Chair (3.3)	20 (3.1)	20 (3.5)
21 Fan (3.0)	18 (3.8)	24 (2.3)
22 Pop Machine (2.7)	18 (3.8)	29 (1.7)
22 Swimming Pool (2.7)	17 (4.4)	37 (1.2)
22 Aquarium (2.7)	51 (0.6)	17 (4.1)
22 File Cabinets (2.7)	23 (2.5)	22 (2.9)
26 Robot (2.1)	27 (1.9)	24 (2.3)
26 Restroom (2.1)	23 (2.5)	29 (1.7)
26 Drinking Fountain (2.1)	20 (3.1)	37 (1.2)
29 A/C (1.8)	51 (0.6)	24 (2.3)
29 Printer (1.8)	—	20 (3.5)
29 Couch (1.8)	27 (1.9)	29 (1.7)
29 Paintings (1.8)	38 (1.3)	24 (2.3)
29 Speakers (1.8)	23 (2.5)	37 (1.2)
29 Alphabet (1.8)	38 (1.3)	24 (2.3)
29 Lockers (1.8)	27 (1.9)	29 (1.7)
36 Chairs with Wheels (1.5)	27 (1.9)	37 (1.2)
36 Video Games (1.5)	27 (1.9)	37 (1.2)
36 Centers (1.5)	38 (1.3)	29 (1.7)
36 Coat Room (1.5)	27 (1.9)	37 (1.2)
40 Tapes & CDs (1.2)	27 (1.9)	50 (0.6)
40 Pet(s) (1.2)	51 (0.6)	29 (1.7)
40 Sink/Running Water (1.2)	27 (1.9)	50 (0.6)
40 Vending Machine (1.2)	38 (1.3)	37 (1.2)
40 Bed (1.2)	38 (1.3)	37 (1.2)
40 Vase (1.2)	27 (1.9)	50 (0.6)
40 Surround Desk (1.2)	38 (1.3)	37 (1.2)
40 Heater (1.2)	38 (1.3)	37 (1.2)
40 Pencil Sharpener (1.2)	51 (0.6)	29 (1.7)

Note. The first number in each column is the rank of the category based on the total population, males, and females, respectively. The number in parentheses indicates the percentage of subjects that included that category in their drawing.

Table 1.
Ranked Categories For Total Students, Males, and Females

Total (N = 335)	Males (N = 160)	Females (N = 172)
Rank Category (%)	Rank (%)	Rank (%)
49 Easel (0.9)	38 (1.3)	50 (0.6)
49 Pond with Animals (0.9)	38 (1.3)	50 (0.6)
49 Garden (0.9)	27 (1.9)	—
49 Microwave Oven (0.9)	27 (1.9)	—
49 Lamps (0.9)	—	29 (1.7)
49 Calculators (0.9)	38 (1.3)	50 (0.6)
49 Wide Desks (0.9)	38 (1.3)	50 (0.6)
49 Shelves (Not Books) (0.9)	51 (0.6)	37 (1.2)

Note. The first number in each column is the rank of the category based on the total population, males, and females, respectively. The number in parentheses indicates the percentage of subjects that included that category in their drawing.

Table 2.

Ranked Categories For Total Students, Primary, Intermediate, and Middle Grades

Total (N = 335)	Primary (N = 85)	Intermediate (N = 170)	Middle (N = 80)
Rank Category (%)	Rank (%)	Rank (%)	Rank (%)
1 Student Desks (43.6)	1 (42.4)	1 (48.2)	4 (35)
2 Chalkboards (42.4)	2 (40)	2 (44.1)	2 (41.3)
3 Computers (38.5)	4 (21.2)	3 (38.8)	1 (56.3)
4 Shelves (26.9)	6 (16.5)	5 (33.5)	5 (23.8)
5 Tables (26.3)	5 (20)	6 (32.4)	8 (20)
6 Clocks (26.0)	3 (35.3)	9 (28.8)	12 (10)
7 Teacher's Desk (25.7)	10 (9.4)	4 (35.3)	6 (22.5)
8 Door (25.1)	6 (16.5)	8 (30.6)	6 (22.5)
9 Chairs (23.6)	6 (16.5)	7 (31.8)	9 (13.8)
10 TV/Large Screen (20.3)	14 (4.7)	10 (20.6)	3 (36.3)
11 Windows (9.0)	12 (8.2)	11 (10)	13 (7.5)
12 Flag (7.8)	9 (11.8)	15 (6.5)	16 (6.3)
13 Globe (6.3)	16 (3.5)	13 (7.1)	13 (7.5)
14 Calendar (5.4)	10 (9.4)	17 (5.9)	—
15 Lights (5.1)	—	12 (8.2)	19 (3.8)
16 Bulletin Boards (4.8)	19 (1.2)	13 (7.1)	19 (3.8)
17 Books (3.9)	13 (5.9)	18 (4.7)	—
18 Wastebaskets (3.6)	17 (2.4)	19 (4.1)	19 (3.8)
18 Closet (3.6)	19 (1.2)	15 (6.5)	—
20 Easy Chair (3.3)	—	38 (1.2)	10 (11.3)
21 Fan (3.0)	—	25 (2.9)	16 (6.3)
22 Pop Machine (2.7)	—	—	10 (11.3)
22 Swimming Pool (2.7)	—	19 (4.1)	29 (2.5)
22 Aquarium (2.7)	17 (2.4)	30 (2.4)	19 (3.8)
22 File Cabinets (2.7)	—	19 (4.1)	29 (2.5)
26 Robot (2.1)	14 (4.7)	38 (1.2)	42 (1.3)
26 Restroom (2.1)	—	25 (2.9)	29 (2.5)
26 Drinking Fountain (2.1)	—	22 (3.5)	42 (1.3)
29 A/C (1.8)	—	30 (2.4)	29 (2.5)
29 Printer (1.8)	—	50 (0.6)	18 (5)
29 Couch (1.8)	—	—	13 (7.5)
29 Paintings (1.8)	19 (1.2)	34 (1.8)	29 (2.5)
29 Speakers (1.8)	—	34 (1.8)	19 (3.8)
29 Alphabet (1.8)	—	22 (3.5)	—
29 Lockers (1.8)	—	22 (3.5)	—
36 Chairs with Wheels (1.5)	—	25 (2.9)	—
36 Video Games (1.5)	—	30 (2.4)	42 (1.3)
36 Centers (1.5)	—	25 (2.9)	—
36 Coat Room (1.5)	—	25 (2.9)	—
40 Tapes & CDs (1.2)	—	50 (0.6)	19 (3.8)
40 Pet(s) (1.2)	19 (1.2)	50 (0.6)	29 (2.5)
40 Sink/Running Water (1.2)	—	38 (1.2)	29 (2.5)
40 Vending Machine (1.2)	—	50 (0.6)	19 (3.8)
40 Bed (1.2)	—	50 (0.6)	19 (3.8)
40 Vase (1.2)	19 (1.2)	38 (1.3)	42 (1.3)
40 Surround Desk (1.2)	—	30 (2.4)	—
40 Heater (1.2)	—	50 (0.6)	19 (3.8)
40 Pencil Sharpener (1.2)	—	38 (1.2)	29 (2.5)

Note. The first number in each column is the rank of the category based on the total population and the various grades. The number in parentheses indicates the percentage of subjects that included that category in their drawing.

Table 2.

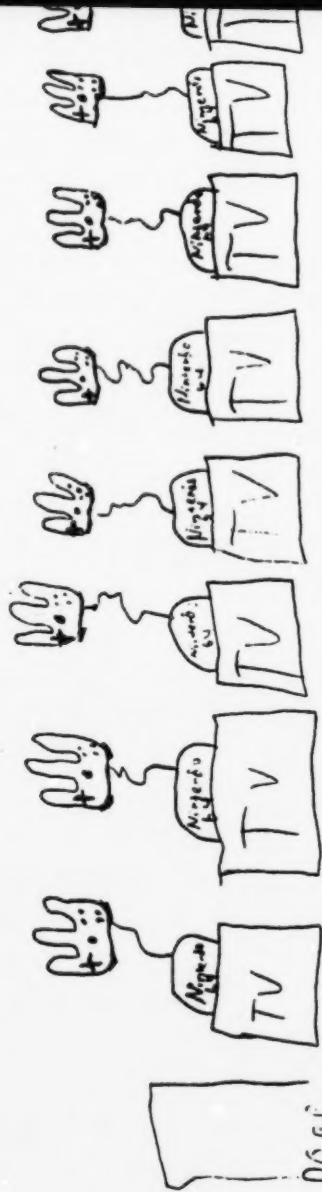
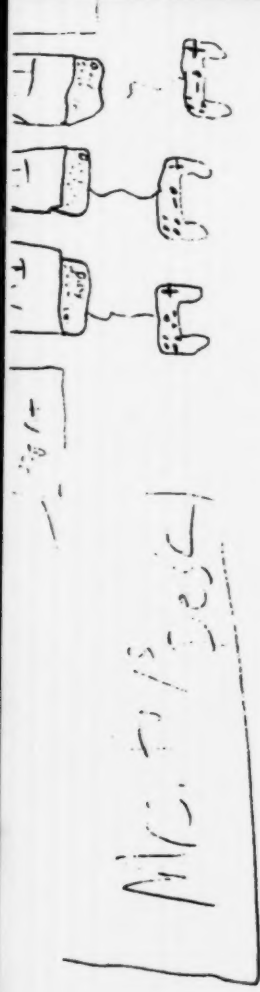
Ranked Categories For Total Students, Primary, Intermediate, and Middle Grades

Total (N = 335)	Primary (N = 85)	Intermediate (N = 170)	Middle (N = 80)
Rank Category (%)	Rank (%)	Rank (%)	Rank (%)
49 Easel (0.9)	—	38 (1.2)	42 (1.3)
49 Pond with Animals (0.9)	—	50 (0.6)	29 (2.5)
49 Garden (0.9)	—	38 (1.2)	42 (1.3)
49 Microwave Oven (0.9)	—	—	19 (3.8)
49 Lamps (0.9)	—	50 (0.6)	29 (2.5)
49 Calculators (0.9)	—	38 (1.2)	42 (1.3)
49 Wide Desks (0.9)	—	34 (1.8)	—
49 Shelves (Not Books) (0.9)	—	34 (1.8)	—

Note. The first number in each column is the rank of the category based on the total population and the various grades. The number in parentheses indicates the percentage of subjects that included that category in their drawing.

Appendix: Samples of student drawings.

Bookbay and coat closet



Intermediate

Male,

Pop
M

vending
M

Chalk Board

computers

big screen T.V
(with 15)

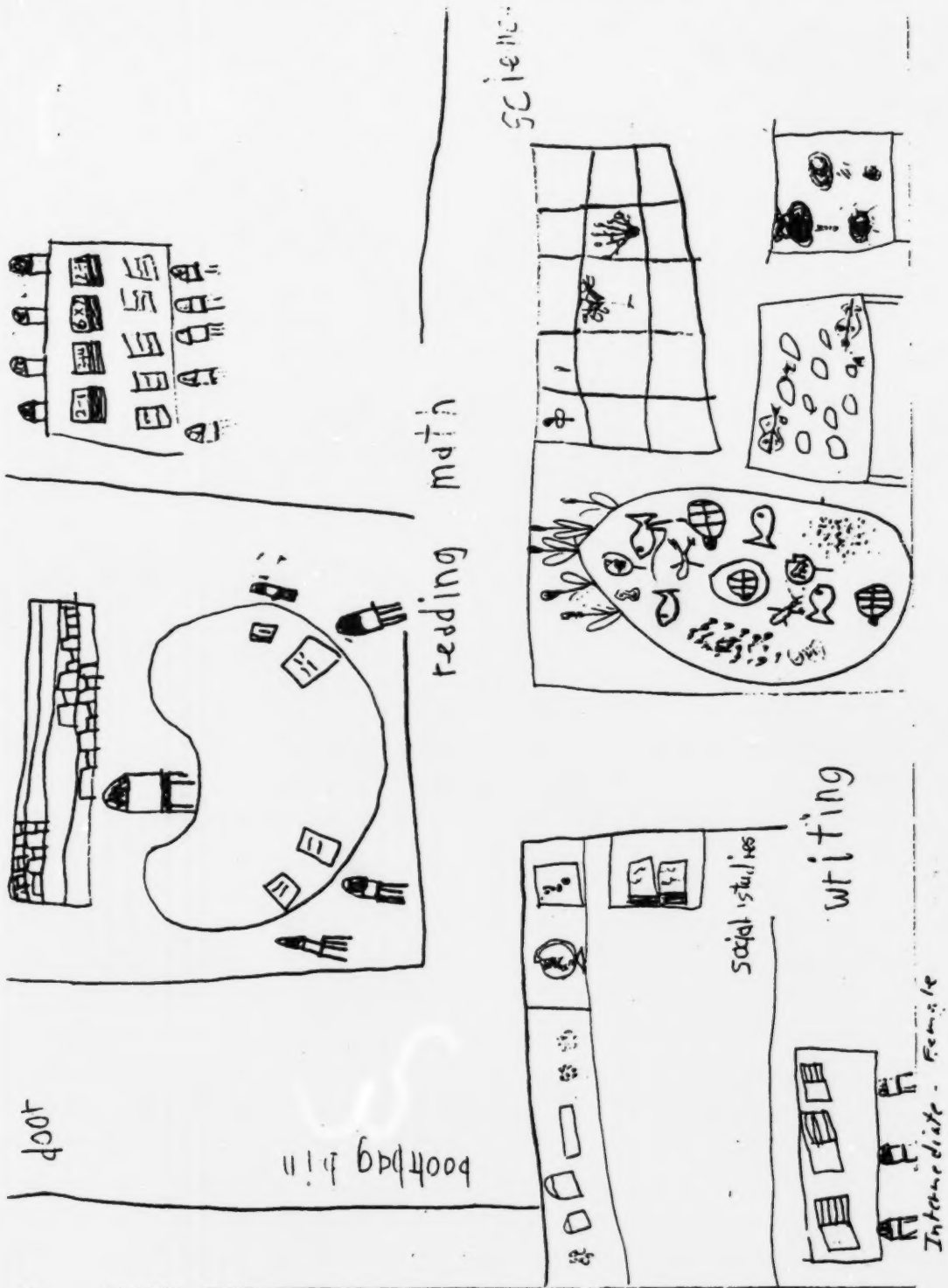
lazy boy

Teachers
Desk

lazy Boys

Books

male, middle school



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